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Introduction: Objective of research is exploitation of the great potential benefits of polyphenols for enhancing mineralization and anticancer ability of bioactive materials for bone implants (titanium alloys, bioactive glasses and hydroxyapatite).

Materials and Methods: Polyphenols were extracted from grape pomace (GPH). A specific protocol for surface functionalization with GPH was developed case by case considering the different surface chemistry of the substrates. A characterization protocol suitable for all the materials was defined (fluorescent microscopy, Folin & Ciocalteu test applied both to GPH solutions and to surface functionalized samples, DPPH, contact angle, zeta potential titration measurements, bioactivity by soaking in Simulated Body Fluid, HPLC). Sterilization was performed through gamma irradiation. Cell cultures finalized to evaluation of mineralization and anticancer ability of GPH solutions, as well as of functionalized and control hydroxyapatite surfaces were performed.

Results & Conclusions: Surface grafting of GPH was positively realized on all the substrates even if in different amount; grafted GPH maintain redox and scavenger activity (even after gamma sterilization), while bioactivity of the substrates is preserved. As assumed, benefits of GPH can be coupled to bioactive substrates. Cytocompatiblity, effective mineralization and antitumoral activity of GPH solutions with different concentration and of functionalized surfaces is discussed.